What is claimed is:

1. A method of noise variance estimation to be performed by a user equipment, comprising steps of:

(a) receiving a signal vector containing training sequence and noise vector transmitted via at least one propagation path from the base station;

(b) estimating the channel impulse response of each propagation path to construct a channel impulse response matrix, according to the signal vector;

(c) calculating the noise variance of the signal vector according to the channel impulse response matrix and the signal vector if the channel impulse response remains primarily unchanged during the special time duration of the training sequence.

2. The method according to claim 1, wherein said special time duration is the time duration of said training sequence.

3. The method according to claim 2, wherein step (c) includes:

(c1) estimating the MLE (maximum likelihood estimation) value of the training sequence contained in said signal vector according to said channel impulse response matrix and said signal vector;

(c2) calculating the estimated value of the noise vector contained in said signal vector according to the MLE value of the training sequence and the known value of said training sequence;

(c3) calculating the noise variance of said signal vector according to the estimated value of the noise vector and said channel impulse response matrix.

4. The method according to claim 3, wherein step (c3) calculates the noise variance of said signal vector with the following formula:

$$\sigma^2 \approx (n'^H n') \, / \, trace\{(H^H H)^{-1}\}$$

wherein:

σ^2 is the noise variance of said signal vector;

n' is the estimated value of the noise vector contained in said signal vector;

H is said channel impulse response matrix, and superscript ^{H} represents complex conjugate transposition;

$trace\{\cdot\}$ denotes computation of a matrix trace.

5. The method according to claim 3 or 4, wherein further comprising:

summing and then averaging the noise variance of said signal vector and the noise variance computed in previous time slot, and taking the average noise variance as the noise variance of said signal vector.

6. An apparatus for noise variance estimation, comprising:

receiving means for receiving a signal vector containing training sequence and noise vector transmitted via at least one propagation path from the base station;

channel estimating means for estimating the channel impulse response of each propagation path to construct a channel impulse response matrix, according to the signal vector;

calculating means for calculating the noise variance of the signal vector according to the channel impulse response matrix and the signal vector if the channel impulse response remains primarily unchanged during special time duration of the training sequence.

7. The apparatus according to claim 6, wherein said special time duration is the time duration of said training sequence.

8. The apparatus according to claim 7, wherein said calculating means includes:

equalizing means for estimating the MLE value of the training sequence contained in said signal vector according to said channel impulse response matrix and said signal vector;

noise estimating means for calculating the estimated value of the noise

vector contained in said signal vector according to the MLE value of the training sequence and the known value of said training sequence;

noise power calculating means for calculating the power of the estimated value of said noise vector according to the estimated value of said signal vector;

noise power revising means for calculating the noise variance of said signal vector according to the power of the estimated value of the noise vector and said channel impulse response matrix.

9. The apparatus according to claim 8, wherein said noise power revising means calculates the noise variance of said signal vector with the following formula:

$$\sigma^2 \approx (n'^H n') / trace\{(H^H H)^{-1}\}$$

wherein:

σ^2 is the noise variance of said signal vector;

n' is the estimated value of the noise vector contained in said signal vector and $n'^H n'$ is the power of the estimated value of said noise vector;

H is said channel impulse response matrix, and superscript ^{H} represents complex conjugate transposition;

$trace\{\cdot\}$ denotes computation of a matrix trace.

10. A user equipment, comprising:

receiving means for receiving a signal vector containing training sequence and noise vector transmitted via at least one propagation path from the base station;

channel estimating means for estimating the channel impulse response of each propagation path to construct a channel impulse response matrix, according to the signal vector;

noise variance estimating means for calculating the noise variance of

the signal vector according to the channel impulse response matrix and the signal vector if the channel impulse response remains primarily unchanged during special time duration of the training sequence;

data detecting means for detecting the received signal vector to obtain the desired signal according to the computed noise variance of the signal vector.

11. The user equipment according to claim 10, wherein said special time duration is the time duration of said training sequence.

12. The user equipment according to claim 11, wherein said noise variance estimating means includes:

equalizing means, for estimating the MLE value of the training sequence contained in said signal vector according to said channel impulse response matrix and said signal vector;

noise estimating means for calculating the estimated value of the noise vector contained in said signal vector according to the MLE value of the training sequence and the known value of said training sequence;

noise power calculating means for calculating the power of the estimated value of said noise vector according to the estimated value of said signal vector;

noise power revising means for calculating the noise variance of said signal vector according to the estimated value of the noise vector and said channel impulse response matrix.

13. The user equipment according to claim 12, wherein said noise power revising means calculates the noise variance of said signal vector with the following formula:

$$\sigma^2 \approx (n'^H n') / \mathit{trace}\{(H^H H)^{-1}\}$$

wherein:

σ^2 is the noise variance of said signal vector;

n' is the estimated value of the noise vector contained in said signal vector and $n'^H n'$ is the power of the estimated value of said noise vector;

H is said channel impulse response matrix, and superscript ^{H} represents complex conjugate transposition;

trace{·} denotes computation of a matrix trace.